RQ

From broad curiosity to an answerable academic question

RESEARCHMETHOD.NET LECTURE SLIDES

How to Formulate Research Questions

A student-friendly lecture on developing clear, focused, researchable, and ethically sound questions for academic studies.

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WHAT THIS SESSION COVERS

Lecture Overview

1. **Meaning and role**

   What a research question is and why it guides the whole study.

2. **Types and structures**

   Qualitative, quantitative, mixed methods, and discipline-specific examples.

3. **Formulation process**

   How to move from a broad topic to a focused, researchable question.

4. **Quality checks**

   How to evaluate clarity, feasibility, ethics, and alignment with methods.

Topic → Problem → Question → Method → Answer

BY THE END OF THIS LECTURE, STUDENTS WILL BE ABLE TO

Learning Objectives

- Define research question, research problem, hypothesis, variable, and population.
- Differentiate descriptive, exploratory, comparative, correlational, causal, qualitative, quantitative, and mixed methods questions.
- Transform a broad research topic into a focused and researchable question.
- Apply criteria such as clarity, feasibility, originality, ethics, and relevance.
- Align research questions with population, data collection, and analysis methods.
- Identify and correct common weaknesses in student research questions.

Measurable actions

- **Define**
- **Differentiate**
- **Transform**
- **Apply**
- **Align**
- **Correct**

Introduction: Why Research Questions Matter

A research question is the central question a study seeks to answer through systematic inquiry. It turns a general interest into a focused investigation that can be supported by evidence.

1

Focus

Prevents the study from becoming too broad.

2

Design

Guides methods, sampling, and analysis.

3

Argument

Shapes the logic of the literature review.

4

Contribution

Shows what the study may add to knowledge.

IMPORTANT TERMINOLOGY

Key Definitions

Term	Student-friendly meaning
Research topic	The broad subject area a researcher is interested in studying.
Research problem	A specific issue, gap, difficulty, or uncertainty that needs investigation.
Research question	A focused, answerable question that directs the study.
Hypothesis	A testable prediction, often used in quantitative studies.
Variable / construct	A measurable feature or concept, such as achievement, stress, or satisfaction.
Population	The group of people, cases, texts, organizations, or units the study concerns.

Background and Academic Context

Research questions became central in modern research methodology because they connect theoretical interest, empirical investigation, and transparent reporting.

Theoretical context

Questions often emerge from theories, concepts, models, or debates in a field.

Literature gap

Questions are strengthened when they address what is unknown, unclear, or under-examined.

Methodological fit

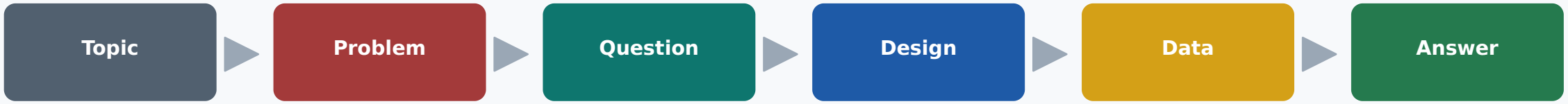
A question should match the kind of evidence the researcher can collect and analyze.

Academic contribution

Good questions make clear why the study matters for knowledge, practice, or policy.

HOW THEY GUIDE THE STUDY

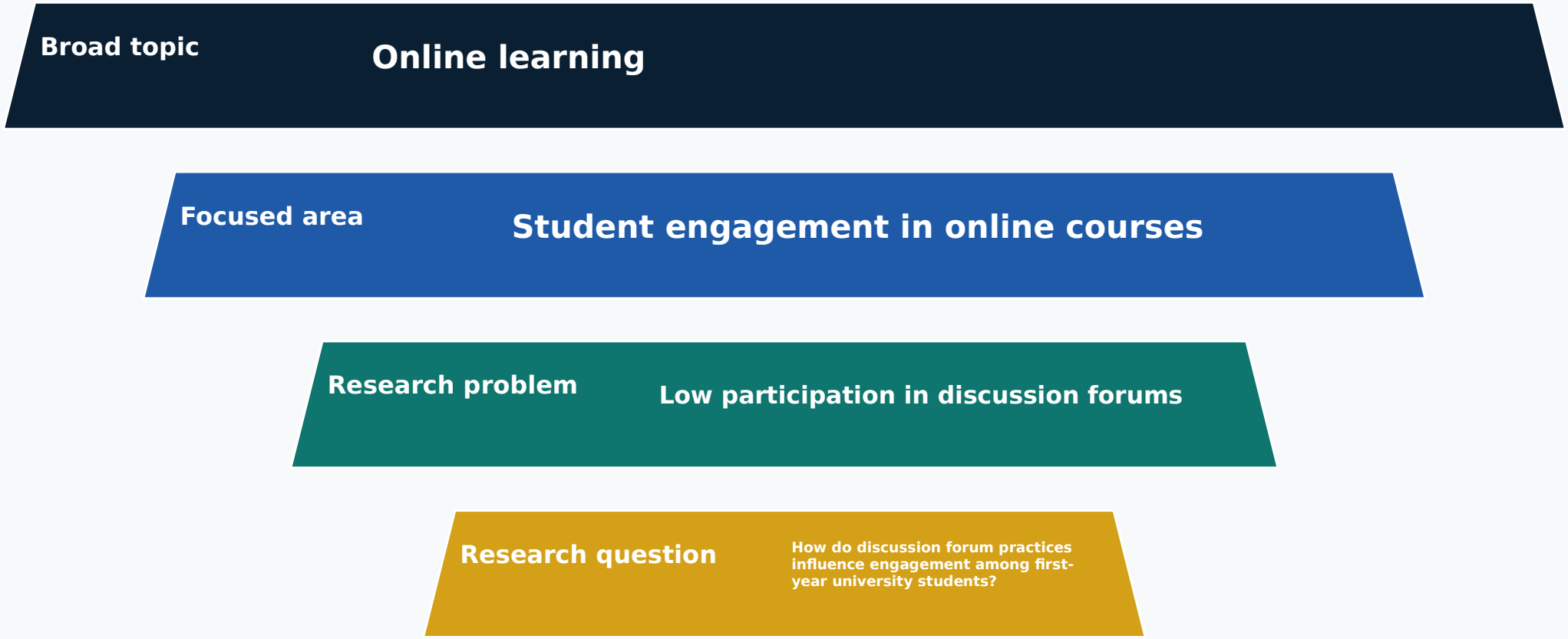
Research Questions in the Research Process



- The question narrows what evidence is needed.
- It helps decide participants, documents, settings, variables, or cases.
- It determines whether analysis should be statistical, thematic, comparative, or interpretive.
- It helps readers understand the purpose and boundaries of the study.

THE FUNNEL PRINCIPLE

From Topic to Research Question



A good question is narrow enough to answer, but meaningful enough to matter.

QUALITY CRITERIA

Characteristics of a Strong Research Question

1 Clear

Uses precise terms that readers can understand.

2 Focused

Has a manageable scope, population, and setting.

3 Researchable

Can be answered with available data and methods.

4 Significant

Addresses a meaningful gap or practical concern.

5 Ethical

Can be studied responsibly without unnecessary harm.

6 Aligned

Matches the research design and analysis plan.

Quick test: Could another researcher understand what evidence is needed to answer it?

CLASSIFYING QUESTIONS BY PURPOSE

Main Types of Research Questions

Descriptive

What is happening?

Exploratory

How or why is it happening?

Comparative

How do groups differ?

Correlational

How are variables related?

Causal

What effect does X have on Y?

Mixed methods

How do numeric and narrative findings connect?

The type of question influences the research design, sampling strategy, instruments, and analysis technique.

WHEN THE GOAL IS TO UNDERSTAND A PHENOMENON

Descriptive and Exploratory Questions

Type	Purpose	Example
Descriptive	Summarizes characteristics, patterns, or conditions.	What are the study habits of first-year biology students?
Exploratory	Investigates meanings, experiences, or possible explanations.	How do first-year biology students describe challenges in adapting to university study?

- Descriptive questions often begin with what, which, how many, or how often.
- Exploratory questions often begin with how or why, especially in qualitative research.
- Both are useful when the topic needs careful mapping before testing relationships.

Comparative, Correlational, and Causal Questions

Type	Main idea	Common wording
Comparative	Compares two or more groups or conditions.	How does academic stress differ between undergraduate and postgraduate students?
Correlational	Examines association between variables.	What is the relationship between sleep quality and academic performance?
Causal / effect	Tests whether one variable influences another.	What effect does feedback frequency have on student motivation?

Caution: Correlation questions do not prove cause-and-effect without a suitable design.

EXPLORING MEANING, EXPERIENCE, AND PROCESS

Qualitative Research Questions

Qualitative questions are usually open-ended and designed to explore meanings, perspectives, practices, contexts, or social processes.

How do... | **What meanings...** | **What experiences...** | **How is... constructed?** | **Why do participants...**

Example

How do first-generation university students experience academic support during their first semester?

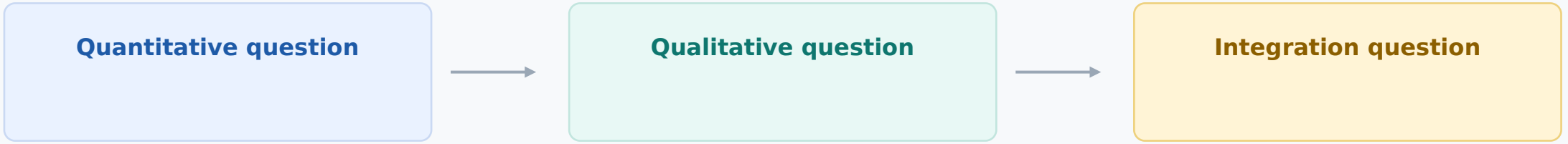
- Avoid yes/no wording.
- Leave room for participants' voices.
- Specify the group and context without over-controlling the answer.

Quantitative Research Questions and Hypotheses

Quantitative questions usually identify variables, a population, and a measurable relationship, difference, or effect. They may be paired with hypotheses.

Question	What is the relationship between screen time and sleep quality among undergraduate students?
Hypothesis	Higher screen time is associated with lower sleep quality among undergraduate students.
Variables	Screen time; sleep quality
Analysis	Correlation or regression, depending on the design and assumptions

Mixed Methods Research Questions



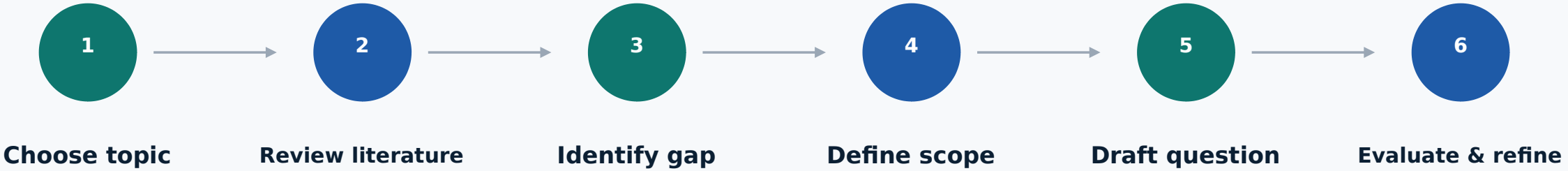
- Mixed methods studies often include separate quantitative and qualitative sub-questions.
- An integration question explains how the two forms of evidence will be connected.
- The wording should reflect the mixed methods design: explanatory, exploratory, convergent, or embedded.

Example: How do survey results and interview findings together explain students’ use of AI writing tools?

Variables, Constructs, Population, and Scope

Element	What it clarifies	Example in a question
Variable / construct	What is being measured or explored.	Academic stress; learning motivation
Population	Who or what the study is about.	Undergraduate nursing students
Context	Where or under what conditions the study occurs.	Online courses in public universities
Time frame	When data or experience is examined.	During the first semester
Scope	What is included and excluded.	Focuses on engagement, not final grades

Step-by-Step Process Overview



Research question formulation is iterative: researchers often revise the question after reading more literature, collecting pilot data, or receiving supervisor feedback.

START BROAD, THEN BECOME SPECIFIC

Steps 1–2: Topic to Literature Gap

Step 1: Choose and narrow a topic

- Begin with an academic field or problem area.
- Narrow by population, setting, variable, time, or context.
- Avoid topics that are too general or purely opinion-based.

Step 2: Review the literature

- Read recent and foundational sources.
- Identify what is known, debated, or missing.
- Look for contradictions, under-studied populations, and methodological gaps.

Steps 3–4: Purpose, Concepts, and Boundaries

Decision	Guiding question	Example
Purpose	What is the main aim of the study?	Explore, describe, compare, explain, test, evaluate
Concepts / variables	What key idea is being studied?	Motivation, stress, satisfaction, adoption
Population	Who or what is included?	Teachers, patients, SMEs, app users
Setting	Where does the study apply?	Universities, hospitals, organizations, online platforms
Boundary	What is outside the study?	Not examining long-term effects or unrelated outcomes

Step 5: Draft Using Question Templates

Question type	Template
Descriptive	What are the characteristics of [phenomenon] among [population] in [context]?
Comparative	How does [outcome] differ between [Group A] and [Group B]?
Correlational	What is the relationship between [variable X] and [variable Y] among [population]?
Qualitative	How do [participants] experience or understand [phenomenon] in [context]?
Mixed methods	How do [quantitative results] and [qualitative findings] together explain [phenomenon]?

USE A QUALITY CHECKLIST

Step 6: Evaluate and Refine the Question

Clarity

Are the key terms understandable?

Focus

Is the scope manageable?

Evidence

Can data answer the question?

Feasibility

Is it possible with available time, access, skills, and resources?

Ethics

Can participants and data be protected?

Alignment

Does the question match the method and analysis?

USEFUL TOOLS FOR DIFFERENT FIELDS

Formulation Frameworks: FINER, PICO, PEO, and SPIDER

Framework	Best suited for	Core components
FINER	General research quality check	Feasible, Interesting, Novel, Ethical, Relevant
PICO	Clinical and intervention questions	Population, Intervention, Comparison, Outcome
PEO	Qualitative and experience-focused questions	Population, Exposure, Outcome/experience
SPIDER	Qualitative and mixed evidence reviews	Sample, Phenomenon of interest, Design, Evaluation, Research type

Use frameworks as planning aids; the final research question should still read naturally and fit the study purpose.

Practical Examples Across Disciplines

Discipline	Broad topic	Research question
Social sciences	Youth civic participation	How do university students describe the role of social media in civic engagement?
Business	Remote work	What is the relationship between remote work frequency and employee job satisfaction?
Education	Feedback	How does formative feedback influence writing confidence among first-year students?
Health sciences	Patient education	What barriers do diabetic patients experience when following dietary advice?
Psychology	Stress	How is perceived stress associated with sleep quality among postgraduate students?
Information technology	AI tools	How do students use generative AI tools during research proposal writing?

DETAILED SCENARIO

Research Example: Applying the Concept in a Study

Research topic	Use of generative AI tools in university learning
Research problem	Students use AI tools, but educators have limited evidence about how this affects research proposal writing practices.
Research question	How do postgraduate students use generative AI tools while developing research proposal drafts?
Population / participants	Postgraduate students enrolled in research methods courses
Data collection method	Semi-structured interviews and document reflections
Data analysis method	Thematic analysis of interview transcripts and reflections
Expected interpretation	Identify patterns of use, perceived benefits, risks, and responsible-use practices

Alignment Matrix: Question, Method, and Analysis

Question wording	Likely design	Data collection	Analysis
What are the levels of...?	Descriptive quantitative	Survey, records	Descriptive statistics
How do participants experience...?	Qualitative	Interviews, focus groups	Thematic or content analysis
How do Group A and Group B differ...?	Comparative quantitative	Test scores, surveys	t-test, ANOVA, nonparametric tests
What is the relationship between X and Y?	Correlational	Scales, measurements	Correlation, regression
How do qualitative findings explain survey results?	Mixed methods	Survey + interviews	Integration / joint display

DO NOT CONFUSE THESE CONCEPTS

Comparison Table: Related Research Elements

Element	Purpose	Example
Research topic	Broad area of interest	Online learning
Research problem	Specific issue or gap	Low student interaction in online forums
Purpose statement	What the study intends to do	This study explores online forum interaction among first-year students.
Research question	What the study seeks to answer	How do first-year students experience online forum interaction?
Hypothesis	Testable prediction	Students who receive weekly prompts participate more frequently.

Advantages and Applications

- Clarify the purpose and boundaries of the study.
- Help select the most appropriate research design and data sources.
- Make literature reviews more focused and efficient.
- Improve the logic of proposals, theses, dissertations, and journal articles.
- Support ethical planning by identifying participants, risks, and data needs early.
- Help supervisors, reviewers, and readers evaluate the study’s contribution.

Good questions make good studies easier to design.

WHAT CAN MAKE QUESTION FORMULATION DIFFICULT

Limitations and Challenges

Too much literature Students may struggle to identify a specific gap.

Limited access The ideal population or data source may not be reachable.

Changing context Social, technological, or policy conditions may shift during the study.

Conceptual ambiguity Terms such as “success” or “quality” may need clearer definitions.

Methodological mismatch A question may require a design beyond the student’s time or skills.

Ethical restrictions Some questions involve sensitive topics or vulnerable participants.

Common Mistakes

- Writing a question that is too broad for the assignment, thesis, or available time.
- Using vague terms such as “impact,” “effectiveness,” or “quality” without defining them.
- Asking yes/no questions that produce shallow answers.
- Mixing several questions into one long sentence.
- Claiming causation when the design only measures association.
- Choosing a question that cannot be answered with accessible data.
- Forgetting to identify the population, setting, or key variables.

Weak wording

“What is the impact of technology on students?”

Problem: too broad, unclear population, undefined technology, no method signal.

PRACTICAL RECOMMENDATIONS FOR STRONG QUESTIONS

Best Practices

Start with one main question

Use sub-questions only when they support the main question.

Use precise wording

Define key concepts, variables, populations, and contexts.

Check feasibility early

Confirm access to data, participants, instruments, and time.

Make the method visible

Question wording should suggest the kind of evidence required.

Revise with feedback

Use supervisor, peer, and literature feedback to improve focus.

Keep ethics central

Avoid unnecessary risk, deception, or intrusive data collection.

Ethical Considerations

Ethical issue	What it means in question formulation
Respect for participants	Avoid questions that stigmatize or exploit individuals or groups.
Informed consent	Make sure the data needed can be collected with clear consent.
Privacy and confidentiality	Do not ask questions requiring unnecessary personal or sensitive data.
Bias and fairness	Avoid leading language or assumptions that pre-judge participants.
Transparency	State the research purpose honestly and report limitations clearly.
Academic integrity	Do not copy questions from other studies without proper adaptation and citation.

Activity or Classroom Exercise

Activity objective

Practice narrowing a broad topic into a focused, feasible, and researchable question.

Instructions

In pairs, choose one broad topic. Identify a population, context, key concept or variable, and research purpose. Draft one question and evaluate it using the checklist.

Expected outcome

Each pair produces one revised research question and explains why it is clear, focused, researchable, and ethical.

Suggested time: 10–15 minutes, followed by peer feedback.

FOR CLASSROOM REFLECTION

Discussion Questions

- Why is a research question more useful than a broad research topic?
- What makes a question researchable rather than merely interesting?
- How can a literature review improve the wording of a research question?
- When should a researcher use qualitative rather than quantitative question wording?
- What is the risk of using causal language without an experimental or strong causal design?
- How can ethical concerns shape the wording of a research question?
- What should a student do if a question is important but not feasible?

QUESTIONS FOR REVIEW

Knowledge Check

- 1. What is the main purpose of a research question?
- 2. Name two features of a strong research question.
- 3. Which type of question asks whether two variables are related?
- 4. Convert this topic into a better question: “AI and education.”
- 5. Why should a research question specify a population?
- 6. What is the difference between a research question and a hypothesis?
- 7. Which framework is commonly used for clinical intervention questions?
- 8. Why is ethical feasibility important when formulating a research question?

SAMPLE ANSWERS

Answer Key

No.	Correct / sample answer
1	To guide what the study will investigate and what evidence is needed.
2	Examples: clear, focused, feasible, researchable, ethical, significant, aligned.
3	Correlational question.
4	Example: How do undergraduate students use generative AI tools when preparing research assignments?
5	It defines who or what the study concerns and helps guide sampling and interpretation.
6	A question asks what will be investigated; a hypothesis predicts an expected relationship or difference.
7	PICO.
8	It protects participants and ensures the required data can be collected responsibly.

FINAL SUMMARY

Key Takeaways and Conclusion

- A research question transforms a broad topic into a focused investigation.
- Strong questions are clear, focused, feasible, ethical, and aligned with methods.
- Question type influences research design, data collection, and analysis.
- Good questions usually emerge through literature review, reflection, and revision.
- Ethical and practical feasibility should be checked before data collection begins.

Conclusion

Formulating research questions is a core academic skill. It improves the quality, coherence, and credibility of every stage of research.

APA 7TH EDITION

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